

REMARKS

This is in response to the Office Action of 31 March 2003. Claims 1-7 are pending in the application, and Claims 1-7 have been rejected.

By this amendment, Claims 6-7 have been cancelled, and new Claims 8-11 have been added.

No new matter has been added.

In view of the amendments above and remarks below, Applicant respectfully requests reconsideration and further examination.

About The Invention

The present invention relates generally to extending battery life in a battery-powered radio; and relates more particularly to providing both a received signal strength indicator and a signal quality indicator, and using both of these metrics in determining when to de-energize the receiver portion of a radio. By combining both the received signal strength indicator and the signal quality indicator, the present invention is able to reduce the average "on time" of the receiver. Such an arrangement is referred to herein as a two stage carrier detection scheme.

Drawings

Applicants note the statement in the present Office Action that indicates the drawings filed on 01 September 2000 have been accepted.

Acknowledgement of Foreign Priority Claim

Applicants note the Examiner has acknowledged the claim for foreign priority, and that the Examiner further indicates that all of the certified copies of the priority documents have been received.

Rejections under 35 USC 103(a)

Claims 1-7 have been rejected under 35 USC 103(a), as being unpatentable over Besharat, et al., (US Patent 6,219,540) in view of Ichikawa, et al., (US Patent 4,506,386).

By this amendment, Claims 6-7 have been cancelled without prejudice or disclaimer.

With respect to Claims 1-5, Applicants respectfully traverse the rejections under 35 USC 103(a) and requests that these rejections be withdrawn.

Each of independent Claims 1 and 5 recite the limitations of a two stage carrier detection scheme. As explained and illustrated in Applicants' specification and figures, a power management arrangement based upon a two stage carrier detection scheme results in reduced power consumption as compared to conventional power management based upon single stage carrier detection. Applicants' two stage carrier detection uses both received signal strength and signal quality determinations in making power management decisions. Applicants' have shown that due to the false carrier detections based on RSSI alone, and due to the relatively long time required for performing a signal quality analysis, that combining the two approaches, even though more complex, results in power savings over conventional approaches to battery power savings in radio equipment, because the average on time of the receiver is thereby reduced.

Besharat, et al., disclose a single stage carrier detection scheme (signal quality detector 154). Similarly, Ishikawa, et al., disclose a single stage carrier detection scheme (decoder 4). These single stage carrier detection schemes are different from Applicants' claimed two stage carrier detection. There does not appear to be a teaching of Applicants' claimed two stage carrier detection power management in the cited references, nor does there appear to be a suggestion or motivation to produce the claimed invention in those cited references.

For at least these reasons, Applicants' respectfully assert that the Claims 1-5 are unobvious in view of Besharat, et al., and Ishikawa, et al.

New Claims 8-11

New Claims 8-11 are directed to a battery-powered radio power saving control based upon two stage carrier detection in which both RSSI and signal quality play a role in determining when to de-energize a receiver circuit. The claimed invention is advantageous with respect to conventional single stage carrier detection schemes because application of the present invention results in a shorter average on time, thereby reducing the amount of power consumed by the receiver circuit.

Support for these Claims can generally be found throughout the specification, and can more particularly be found at page 5, line 9, through page 6, line 17, and in Figs. 2 and 4.

Conclusion

All of the rejections in the outstanding Office Action of 14 January 2003 have been responded to, and Applicants respectfully submit that the pending Claims 1-5 and 8-11 are now in condition for allowance.

Attached hereto is a marked-up version of the changes made to the specification by the current amendment. The attached page is captioned "Version with markings to show changes made".

Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

By 

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Version with markings to show changes made

In the Claims

1 8. (New) A battery-powered radio, comprising:

2 a receiver circuit, the receiver circuit operable to produce a received signal

3 from a channel;

4 a received signal strength indicator circuit coupled to the receiver circuit,

5 the received signal strength indicator circuit operable to produce an output

6 indicating an amount of power in the channel;

7 a demodulator circuit coupled to the receiver circuit, the demodulator

8 operable to produce a demodulated signal from the received signal;

9 a decoder circuit coupled to the demodulator circuit;

10 a signal quality indicator circuit coupled to the demodulator circuit; and

11 a microprocessor coupled to the receiver, the received signal strength

12 indicator circuit, the signal quality indicator circuit, and the decoder circuit;

13 wherein the microprocessor is operable to energize and de-energize the

14 receiver circuit; determine the presence of a carrier with a carrier detect false

15 rate, based, at least in part, on the power in the channel, and to determine an

16 acceptable signal quality with a signal quality false rate, based, at least in part,

17 on an output of the signal quality indicator circuit.

1 9. (New) The battery-powered radio of Claim 8, wherein the microprocessor is

2 operable to energize the receiver circuit for a first period of time, and, if the

3 carrier is determined to be present, to then maintain the receiver in the energized

4 state until a determination is made as to whether acceptable signal quality has
5 been obtained.

1 10. (New) The battery-powered radio of Claim 9, wherein the microprocessor is
2 operable to de-energize the receiver circuit if the carrier is determined to not be
3 present, without performing a signal quality determination.

1 11. (New) The battery-powered radio of Claim 10, further comprising:
2 a metering unit coupled to the microprocessor;
3 an encoder circuit coupled to the microprocessor; and
4 a radio transmitter circuit coupled to the encoder circuit.